(3 Hours) [Total Marks : 80

N.B. : (1) Question number **1** is **compulsory**.
Out of remaining question solve any **three**
(2) Draw figures wherever necessary .
(3) Assume suitable data wherever necessary.

1. (a) Consider a disk I/O system in which an I/O request arrives at a rate of 100 I/O s per   **10**
second. The disk service time is Rs= 8ms, Calculate the measures of disk
performance
(a) Utilization of 1/0 controller (U)
(b) Total response time (R)
(c) Average Queue size
(d) Total time spent by a request in the queue
Considering the same disk I/O system and calculate the above measures of the disk
performance if the disk service time is halved i.e. R_s=4ms.

(b) Explain ILM and its benefits. How ILM can be implemented as a strategy for hospital   **10**
managementsystem.

2. (a) Explain FC SAN topologies and FC protocol Stack   **10**
(b) Explain IP storage standards.

3. (a) Explain the Architecture and implementation related limitations of storage   **10**
virtualization.

(b) Differentiate between symmetric and asymmetric storage virtualization and block   **10**
level and file level storage virtualization.

4. (a) What is Information Availability and Information unavailability? Explain BC planning   **10**
life cycle.
(b) Explain Network data management protocol (NDMP).   **10**

5 (a) Define Information system. List out the components of an information systems.   **10**
What is the difference between general purpose and specialized information systems?
(b) Explain the Boolean based matching process in detail.   **10**

6. Write short notes on: (Any **four**)
(a) Intelligent Storage system   (b) Zoned bit recording   **20**
(c) FC ports   (d) Comparison of FC SAN, iSCSI, NAS.
(e) Backup Operations
(f) Document surrogates   (g) Document term Matrices

QP Code :725302

(Time: 3 Hrs)   Marks: 80

N.B. : 1. Question no. 1 is **compulsory**.
      2. Solve any **Three** questions out of remaining **Five** questions.

Q-1   **Write short Note on:**

  a) Big Data & its characteristics   5

  b) Distance Measures for Big Data   5

  c) The Map & Reduce Tasks   5

  d) Multistage Frequent Itemset Mining Algorithm   5

Q-2 **a)** Explain HDFS architecture with diagram.   10

 **b)** Explain Column family store and Graph Store NoSQL architectural pattern with examples.   10

Q-3 **a)** Explain Matrix-Vector multiplication algorithm by MapReduce?   10

  b) Explain Issues in Data stream query processing?   10

Q-4 **a)** Explain   10

    1) Bloom Filter with the help of an example

    2) Steps of HITS algorithm

  b) Explain structure of web with suitable diagram?   10

Q-5 **a)** Explain Park-Chen-Yu algorithm? How memory mapping is done in PCY?   10

  b) Explain CURE algorithm with initialization & completion phase?   10

[Turn Over

Q-6 a) How recommendation is done based on properties of product? Explain with   10
suitable example?

b) For following graph, show how the clique percolation method (CPM) find cliques.   10
Explain with steps?

QP Code :729100

(3 Hours) [Total Marks: 80]
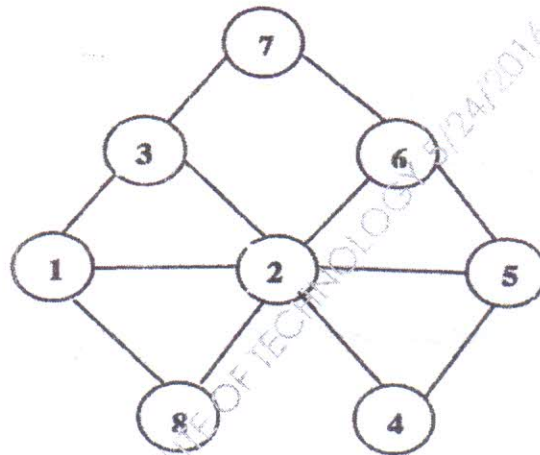
N.B. :
1. Question No. 1 is compulsory.
2. Out of remaining 5 questions, attempt any three questions.
3. Assume suitable data wherever required but justify the same.
4. All questions carry equal marks.
5. Answer to each new question to be started on a fresh page.
6. Figure to the right in brackets indicate full marks.
7. Use of statistical table is allowed.

1. (a) Briefly explain the steps in simulation study. (5)

(b) Compare random numbers and random variate: (5)

(c) Explain data collection and analysis in input modeling :- (5)

(d) State queue notation, queue discipline and queue behavior:- (5)

2. (a) Discuss various costs that are involved in inventory system. Explain the policy and goal of inventory system:- (10)

(b) Consider the following sequence of 5 numbers

0.15, 0.94, 0.05, 0.51, 0.29

Use the kolmogorov – Smirnov test to determine whether the Hypothesis of uniformity can be rejected. Given $\alpha=0.05$ and the critical value of D=0.565 (10)

3. (a) What is time-series input model? Explain AR(1) and EAR(1) model:- (10)

(b) Records pertaining to the monthly number of job-related injuries at an Underground coal mine were being studied by federal agency. The values for the past 100 months were as follows:-

Injuries per month	0	1	2	3	4	5	6
Frequency of occurrence	35	40	13	6	4	1	1

Apply the chi-square test to these data to test the hypothesis that the underlying distribution is Poisson. Use the level of significance $\alpha=0.05$ (10)

[Turn Over

4. (a) A tool crib has exponential inter-arrival and service times and serves a very large group of mechanics . The mean time between arrivals is 4 minutes. It takes 3 minutes on the average for a tool-crib attendant to service a mechanic. The attendant is paid $10 per hour and the mechanic is paid $15 per hour. Would it be advisable to have a second tool-crib attendant? (10)

   (b) What do you understand by model verification and validation? How would you Validate input-output transformation of a model? (10)

5. (a) Give the equation for steady state parameters of M/G/1 queue and derive M/M/1 From M/G/1:- (10)

   (b) Explain Inverse-Transform technique:- (10)

6. (a) Explain Manufacturing and Material handling system:- (10)

   (b) Explain Reliability System in detail:- (10)

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Q.P. Code : 720801

(3 Hours)   [Total Marks : 80

N.B. : (1)   Question no. 1 is compulsory.
        (2)   Solve any Three questions out of remaining Five questions.

1 a)   Give the application scope of Neural Networks.   5
   b)   What is activation function? Discuss the role of Sigmoidal activation   5
        function in backpropagation.
   c)   Define soft computing. Distinguish between soft computing and hard   5
        computing?
   d)   Explain in short the membership functions in Fuzzy Set.   5

2 a)   Explain in detail the back-propagation algorithm.   10
   b)   Discuss fuzzy composition techniques with suitable example.   10

3 a)   Explain in detail the Genetic Algorithm based backpropagation network.   10
   b)   Two fuzzy relations are given by   10

$$R = \begin{array}{c} \\ x_1 \\ x_2 \end{array}\begin{array}{cc} y_1 & y_2 \\ \begin{bmatrix} 0.6 & 0.3 \\ 0.2 & 0.9 \end{bmatrix} \end{array}$$

$$S = \begin{array}{c} \\ y_1 \\ y_2 \end{array}\begin{array}{ccc} z_1 & z_2 & z_3 \\ \begin{bmatrix} 1 & 0.5 & 0.3 \\ 0.8 & 0.4 & 0.7 \end{bmatrix} \end{array}$$

Obtain fuzzy relation T as a max-min composition and max-product
composition between the fuzzy relations.

4 a)   What is linear Separability? Justify-XOR function is non-linearly separable   10
        by a single decision boundafy line.
   b)   Describe in detail the formation of inference rules in a Mamdani Fuzzy   10
        Inference System.

5 a)   State and justify the role of vigilance parameter in ART network.   10
   b)   Implement OR function using perceptron networks for bipolar inputs and   10
        targets.

6 a)   Write short note on Defuzzification.   5
   b)   Write short note on Delta Learning Rule.   5
   c)   Explain applications of Hybrid Systems.   5
   d)   Explain in short Radial Basis Function Network   5

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QP Code : 720901

(3 Hours) [Total Marks :80

N.B. : (1) Question no. **1** is **compulsory**
(2) **Attempt** any **three** questions out of remaining **five** questions.

1. (a) With example explain Failure, Defect and Error 5
   (b) Explain STLC 5
   (c) Explain software quality metrics 5
   (d) Issues in Object Oriented Testing 5

2. (a) What is Verification and Validation? What is it's need ? 10
   (b) A program reads three numbers n1, n2, n3, in the range -100 to 100 and prints the 10
   smallest number. Design test cases for this program using equivalence class testing
   technique.

3. (a) Draw control flow graph and find cyclomatic complexity for the following PDL 10
   if(c1 or c2 and c3) s1;
   else s2;
   while(c4) s3;
   s4;
   do s5; while (c5);
   s6
   (b) Design test cases to find maximum of 4 nos. 10

4. (a) Explain static Data Flow Testing with example 10
   (b) Explain different types of Incremental Integration Testing Methods 10

5. (a) Explain entry and exit criteria for Alpha and Beta Testing. How Alpha testing differs 10
   from Beta testing.
   (b) T contains 90 tests of which 20 are modification-revealing for P and P' and M selects 10
   12 of these 20 tests, then calculate the inclusiveness of M relative to P,
   P', and T.

6. (a) Explain structure of Testing Group 5
   (b) Explain different size metrics 5
   (c) What is test suite? Why it grows. 5
   (d) Elaborate on SQA Models in brief 5